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YOUNG & THOMPSON
745 SOUTH 23RD STREET 2ND FLOOR
ARLINGTON, VA 22202

EXAMINER	
CANTELMO, GREGG	
ART UNIT	**PAPER NUMBER**
1745	19

DATE MAILED: 02/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/601,477	PARTINGTON ET AL.	
	Examiner	Art Unit	
	Gregg Cantelmo	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the corresp ndence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the amendment received November 14 2003:

   a. The drawing objection has been overcome in light of the amendment;

   b. The specification objection stands;

   c. The claim objections have been withdrawn in light of the amendment;

   d. The 112 rejections have been withdrawn in light of the amendment;

   e. The prior art rejection stands as modified below. This is a new grounds of rejection which is not necessitated by amendment. Therefore this action is non-final.

Specification

2. The disclosure is objected to because of the following informalities: the term "characterised" should be --characterized--. Appropriate correction is required.

There is no clear response to this specification objection, therefore it stands.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 16-20 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent No. 4,983,475 (Delans) in view of GB 1 590 947 (GB '947) and U.S. patent No. 4,760,001 (Nann).

Delans discloses of a battery comprising a housing containing a plurality of positive plates 50 and negative plates 40 connected in parallel, the positive plates each being of substantially the same size and rectangular shape having two longer edges and first and second short edges (Figs. 3 and 4). The housing contains a member 58 being electrically connected to the first short edge of the positive plate 50 adjacent to one of the two sets of long edges and the second end being electrically connected to the second short edge of the positive plate (Fig. 3 as applied to claim 16).

The negative plates 40 are each substantially the same size and rectangular shapes having two long edges and first and second short edges and a member 38. Member 38 has a first end and second end, the first end being electrically connected to the first short edge of the negative plates and the second end being electrically connected to the second short edge of the negative plates (Figs. 3 and 4 as applied to claim 17).

The negative plates 40 and positive plates 50 are substantially the same size (Figs. 3 and 4 as applied to claim 18).

The first short edges of the positive plates are connected by a connector 36A which is electrically connected to a positive terminal 37 (Fig. 3 as applied to claim 19).

The second short edges of the positive plates are connected by a further connector 36B (Fig. 3 as applied to claim 20).

The battery is a lead-acid battery (col. 9, ll. 28-29 as applied to claim 23).

The diagonal member can be copper covered in lead (col. 9, ll. 61-66 as applied to claim 24).

The differences between the instant claims and Delans are that Delans does not disclose of the members being parallel to the long edges of the positive and negative plates (claims 16 and 17) or of the members having a higher conductivity than the plates (claims 16 and 17).

The aim of Delans is to reduce the electrical resistance of the battery and improve the electrical characteristics of the battery under load conditions (abstract). Thus Delans is drawn to the same field of endeavor.

With respect to the relative conductivity of the materials:

The invention of Delans is to reduce the electrical resistance of the battery and improve electrical characteristics of the battery (abstract). To optimize the electron flow, Delans incorporates bars 38 and 58, for example, to achieve these effects. One of ordinary skill in the art would have found it obvious to select the bar materials of Delans to have a conductivity which is greater than the plates since it would have achieved the improvements disclosed in Delans. It would not have been obvious to select material having the same or lower conductivity for the bars since it would not have reduced the electrical resistance of the battery and failure to provide a path of lower resistance for the electron flow.

Since the cross section of the bars is smaller than the sum of the cross sections of the plates, in order to maximize the effects desired by Delans, the conductivity of the bars should be higher than the conductivity of the plates to compensate for the difference in surface area for the electrons to travel along the bars and reduce the electrical resistance of the battery (GB '947 page 1, lines 9-80).

The motivation for selecting a material having a higher conductivity than the plates is that it would have compensated for the difference in surface area for the electrons to travel along the bars (members) and thus reduced the electrical resistance of the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of to provide the bars (members) with a material having a higher electrical conductivity than the plates since it would have compensated for the difference in surface area for the electrons to travel along the bars (members) and thus reduced the electrical resistance of the battery.

With respect to the parallel arrangement of the connecting members:

The arrangement of the connecting members of Delans is arranged diagonally. Yet these members provide the same function as the parallel members in the instant claims. Rearranging the diagonal members to be parallel would have been an obvious geometric alternative and optimization of the arrangement would have only required routine experimentation. Such a rearrangement of parts has been held to involve routine skill in the art. *In re Japiske*, 86 USPQ 70.

Furthermore, the nature of the arrangement of the connecting members of Delans is relative to the placement of the positive and negative plate straps. The plate straps as shown in Delans are such that the positive and negative straps on opposing ends of the plate are disposed at opposed diagonal corners of the plate.

Plate strap locations can be disposed in any number of arrangements whether being in a diagonal relationship as shown by Delans or in a parallel relationship as shown in the figures of GB '947 and Nann (especially Fig. 4 which shows parallel terminal arrangements for both the positive and negative lugs).

Thus one of ordinary skill in the art would have found it obvious to provide a parallel arrangement for the connecting members relative to the orientation of the plate straps being disposed in parallel to one another as opposed to diagonally. Such an arrangement would have provided the same electrical connection while using less material and having a shorter path of conductance across the parallel connector.

Response to Arguments

5. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

With respect to these arguments as directed to the modified rejection above:

a. Applicant argues that it would not have been obvious to one of ordinary skill in the art to modify the diagonal connectors to be parallel connectors.

The Examiner respectfully disagrees.

The arrangement of the diagonal connectors is due to the fact that the plate straps of the same polarity are disposed diagonally to one another.

Therefore the arrangement of the plate straps materially affects the placement and design of the connector.

If the plate straps are disposed along the same parallel path as shown in GB '947 and Nann for example, then it would have been obvious to one of ordinary skill in the art to design the connectors to be parallel as opposed to diagonal so that the connectors would only connect straps of the same polarity.

b. Applicant argues that the arrangement of the present invention being parallel as opposed to diagonal provides a shorter length which lowers the cost of the battery and reduces the electrical resistance of the battery.

While such is not explicitly disclosed in Delans, the benefits of such an arrangement are held to be well within the skill of the ordinary worker in the art.

The ordinary worker in the art would have recognized that using less material would save money and thus is not held to be an unobvious or unexpected result.

Additionally one of ordinary skill in the art having elementary knowledge of electrical conductivity would have known that reducing the path through which electricity travels will obviously result in a lowering of the internal resistance and thus is not held to be an unobvious or unexpected result.

c. Applicant argues that by arranging the diagonal bars to be parallel it would require a wider container with different end walls.

One of ordinary skill in the art would have found modification of the battery container relative to the shape and design constraints of the battery to have obvious.

The concept of configuring a container to properly store a component therein is well within the skill of the ordinary worker in the art and directly influenced by the shape and design constraints of the battery. Thus in reconfiguring the battery of Delans to have parallel connectors, in order to effectively encase the battery, one of ordinary skill in the art would have found it obvious to modify the case since it would have provided a case design where in the battery would effectively fit.

Note that in Applicant's arguments to reconfiguring the container they do not state that modifying the container is beyond the scope of one of ordinary skill in the art. And it is held that modifying the shape of the container is a matter of obvious design choice dependent upon the shape and design constraints of the battery.

Claim Rejections - 35 USC § 103

6. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delans in view of GB '947 and Nann as applied to claims 16-20 and 23-24 above, and further in view of U.S. patent No. 4,634,642 (Lopez Doriga).

The differences not yet discussed are of the further connector being the same material as the positive plate (claim 21), of the further connector being the same material as the member (claim 22).

Lopez Doriga teaches that it is desired to have the terminals, connectors and battery plates be of the same material (col. 2, ll. 64-66).

Use of the same material for these components provides the same level of conductivity of the battery components.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Delans by selecting the material for the connector and the positive plate to be the same and of the connector and bar (member) being the same since it would have provided the same degree of conductivity of the material in the respective paths. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

7. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delans in view of GB '947 and Nann as applied to claims 16-20 and 23-24 above, and further in view of U.S. patent No. 3,914,134 (Carson).

The difference not yet discussed is of the connector comprising copper covered in lead.

One feature of the principles of Carson, which serves to increase electrical conductivity, thereby improving efficiency, are copper cores bonded by casting techniques within both the lead -alloy connector elements and the upstanding posts on the straps. For ease of bonding the copper cores to the connector elements, the cores

are initially electroplated with a 0.0005-inch deposit of 50 percent tin-50 percent lead alloy. As a consequence thereof, the current bearing capacity of the connectors is enhanced to the point that large amounts of current are accommodated (col. 3, ll. 36-46).

The motivation for providing a connector comprising copper covered in lead is that it increases the electrical conductivity of the battery and further reduces the weight of the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Delans by providing a connector comprising copper covered in lead since it would have increased the electrical conductivity of the battery and further would have reduced the weight of the battery. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

8. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Delans in view of GB '947 and Nann as applied to claim 25 above, and further in view of U.S. patent No. 5,348,817 (Rao).

The difference not yet discussed is of the positive terminal being copper covered in lead.

Rao teaches of a bipolar lead-acid battery wherein the end plates and terminals comprise lead-plated copper (col. 9, ll. 30-37).

The motivation for using lead-coated copper is that it enhances the conductivity of the plates while reducing the overall weight of the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Delans by using lead-coated copper materials as the end plates and terminals since it would have enhanced the conductivity of the plates while reduced the overall weight of the battery. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

9. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Delans in view of GB '947 and Nann as applied to claims 16-20 and 23-24 above, and further in view of U.S. patent No. 5,470,679 (Lund).

The difference not yet discussed is of the member being a copper alloy covered in a lead sheath.

Delans teaches of using a lead coated copper material. Delans does not explicitly recite that the material can be a copper alloy.

One of ordinary skill in the art would have found it obvious to replace copper with a copper alloy so long as the member was made of any electron-conducting substance, which undergoes no chemical change in an assembled battery. Lund teaches that the use of copper alloy components in a lead acid battery is advantageous in that it provides rigidity, low resistance and current-carrying capability/ (col. 5, ll. 39-47).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Delans by selecting the member to be a copper alloy covered in a lead sheath since it would have provided an equivalent material that provided a high level of electrical conductivity at a reduced weight. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

10. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Delans in view of GB '947 and Nann as applied to claims 16-20 and 23-24 above, and further in view of U.S. patent No. 3,922,175 (Grangvist).

The difference not yet discussed is of the member or bars comprising aluminum covered in a lead sheath.

The invention of Delans is to reduce the electrical resistance of the battery and improve electrical characteristics of the battery (abstract). To optimize the electron flow, Delans incorporates bars 38 and 58, for example, to achieve these effects. One of ordinary skill in the art would have found it obvious to select the bar materials of Delans to have a conductivity which is greater than the plates since it would have achieved the improvements disclosed in Delans. It would not have been obvious to select material having the same or lower conductivity for the bars since it would not have reduced the electrical resistance of the battery by failing to provide a path of lower resistance for the electron flow.

Since the cross section of the bars is smaller than the sum of the cross sections of the plates, in order to maximize the effects desired by Delans, the conductivity of the bars should be higher than the conductivity of the plates to compensate for the difference in surface area for the electrons to travel along the bars and reduce the electrical resistance of the battery.

Aluminum is an obvious choice as a metal having high conductivity. The internal resistance has been a matter of concern, and attempts have been made to reduce it by making the connecting lines between the electrodes of a metal of another type of lesser specific resistance, for example, aluminum covered with lead, so that the aluminum does not come in contact with the electrolyte (col. 2, ll. 25-37).

In the case of a lead storage cell, conductors 35 and 36 must be made out of lead, and where it is important to decrease the internal resistance, the rising conductors located outside the elements should be made of material with better conductivity, for example, copper or aluminum (col. 5, ll. 16-21).

The motivation for selecting aluminum as the member or bar material is that it would have provided a member or bar having reduced electrical resistance, thus increased electrical conductivity. The result would have improved the overall efficiency of the battery. Furthermore using aluminum would have reduced the overall weight of the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Delans by selecting the bar material to be aluminum since it would have provided a material having enhanced

conductivity and further reduced the overall weight of the battery. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

The motivation for providing a lead sheath covering to the aluminum is that it protects the conductive material from the electrolyte.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Delans by covering the bar member with a lead sheath to protect the conductive bar from the electrolyte. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

11. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Delans in view of GB '947 and Nann as applied to claims 16-20 and 23-24 above, and further in view of U.S. patent No. 2,739,997 (Carrick).

The difference not yet discussed is of the member or bars comprising an aluminum alloy covered in a lead sheath.

The invention of Delans is to reduce the electrical resistance of the battery and improve electrical characteristics of the battery (abstract). To optimize the electron flow, Delans incorporates bars 38 and 58, for example, to achieve these effects. One of

ordinary skill in the art would have found it obvious to select the bar materials of Delans to have a conductivity which is greater than the plates since it would have achieved the improvements disclosed in Delans. It would not have been obvious to select material having the same or lower conductivity for the bars since it would not have reduced the electrical resistance of the battery by failing to provide a path of lower resistance for the electron flow.

Since the cross section of the bars is smaller than the sum of the cross sections of the plates, in order to maximize the effects desired by Delans, the conductivity of the bars should be higher than the conductivity of the plates to compensate for the difference in surface area for the electrons to travel along the bars and reduce the electrical resistance of the battery.

Carrick discloses that using an aluminum or aluminum alloy material covered in lead within a lead acid battery will reduce the overall weight of the battery. In addition, one of ordinary skill in the art would have recognized that such a modification would also have increased the conductivity of the battery since aluminum has a greater conductivity than lead (col. 3, ll. 3-9 and col. 5, ll. 55-68).

The motivation for selecting an alloy of aluminum as the member or bar material is that it would have provided a member or bar having reduced electrical resistance, thus increased electrical conductivity. The result would have improved the overall efficiency of the battery. In addition, the use of an aluminum alloy would have reduced the weight of the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Delans by selecting the bar material to be an alloy of aluminum since it would have provided a material having enhanced conductivity and further reduced the overall weight of the battery. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

The motivation for providing a lead sheath covering to the aluminum alloy is that it protects the conductive material from the electrolyte.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Delans by covering the bar member with a lead sheath to protect the conductive bar from the electrolyte. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

12. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delans in view of GB '947 and Nann as applied to claims 16-20 and 23-24 above, and further in view of JP 63-125519 (JP '519)

The difference not yet discussed is of covering the lead sheath with an acid resistant material (claim 27) and of the material being an epoxy resin (claim 28).

Coating of metallic components with acid resistant epoxy resin materials is a commonplace technique in the art of manufacturing lead-acid battery grids (see abstract of JP '519).

The motivation for providing an acid resistant cover to the lead sheath is to prevent the lead sheath from being corroded.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Delans by covering the lead sheath in an acid resistant material since it would have protected the lead sheath and underlying conductive material from corrosion. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

Response to Arguments

13. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Applicant provides no additional arguments to the 103 rejections above apart from those drawn to the primary rejection of Delans in view of GP '947 and Nann, discussed above and incorporated herein.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (571) 272-1283. The examiner can normally be reached on Monday to Thursday from 9 a.m. to 6 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. FAXES received after 4 p.m. will not be processed until the following business day. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gregg Cantelmo
Patent Examiner
Art Unit 1745

gc

February 9, 2004